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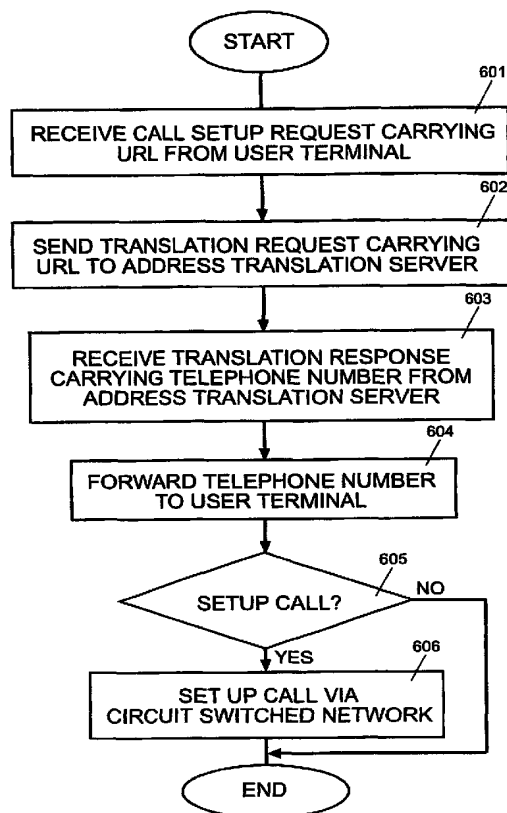
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(54) Title: SYSTEM AND METHOD FOR ESTABLISHING A CALL IN A TELECOMMUNICATIONS NETWORK



(57) Abstract: The present invention relates to a system and method for establishing a call in a telecommunications network such as PSTN networks (PSTN, Public Switched Telephone Network), PLMN networks (PLMN, Public Land Mobile Network), ATM networks (ATM, Asyn-chronous Transfer Mode), IP Multime-dia networks (IP, Internet Protocol) or third generation mobile network.

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SYSTEM AND METHOD FOR ESTABLISHING A CALL IN A TELECOMMUNICATIONS NETWORK

Technical field of the invention

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The present invention relates in general to telecommunications networks such as PSTN networks (PSTN, Public Switched Telephone Network), PLMN networks (PLMN, Public Land Mobile Network), ATM networks (ATM, Asynchronous Transfer Mode), IP Multimedia networks (IP, Internet Protocol) or third generation mobile networks and more specifically to system and method for establishing a call in a telecommunications network.

15 Background of the invention

Communications, wireless communications in particular, is becoming more and more important part of our lives. Nowadays people are sending emails and SMS-messages to each other ever more frequently.

Majority of communications users reaches each other via conventional wireline telephones and via portable mobile phones i.e. to establish a standard telephone call. However there are a large and steadily growing number of users that follow the latest trends and innovations in technology. These advanced users like to establish their telephone calls using other equipment like Personal Computers, WAP phones and soon third generation mobile devices.

30

Communications users are typically contacting many other users over a time. It is quite difficult for a user to keep track of all of their phone numbers. Sometimes a user may want to contact another user only knowing the name of this user. One may use a regular or corporate telephone directory to find out the missing phone number. One may

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try reaching the other user via a corporate switchboard. None of the existing solutions solve the problem adequately when a user has a phone number missing or misplaced.

5

For a better understanding of the prior art relation to the present invention reference will be made to the accompanying drawings, in which:

Figure 1 illustrates a prior art telephone call made
10 over a packet switched network,

Figure 2 illustrates a telephone call made over a packet switched network with a prior art advanced user terminal.

15 Figure 1 illustrates a prior art telephone call made over a packet switched network. When a user 101 normally makes a telephone call to target user 107, the call is normally routed via a regular circuit switched network 102, 106. Some service providers offer nowadays cheaper tariffs for
20 long distance calls, in particular for overseas calls between Europe and North America. The traffic of these calls may use both the circuit switched network 102, 106 and the packet switched network 104.

25 When a user 101 makes a long distance call, the circuit switched network 102 the call is routed to a PSTN Gateway 103. The PSTN Gateway 103 forwards the call traffic in a right format to the packet switched network 104 in which the call traffic is in turn routed to another PSTN Gateway
30 105 on the target user 107 side. The PSTN Gateway 105 forwards the call traffic to the circuit switched network 106, which in turn routes the call traffic to the target user 107.

35 Figure 2 illustrates a telephone call made over a packet switched network with a prior art advanced user terminal.

In this figure the user initiates the telephone call to target user 107 with a prior art advanced user terminal 201. The advanced user terminal can for example be a PC, a special-dedicated IP telephony terminal or a third generation IP Multimedia terminal.

The advanced user terminal initiates the telephone call directly to the packet switched network 104. The packet switched network 104 routes the call traffic to the PSTN Gateway 105 on the target user's 107 side. The PSTN Gateway 105 forwards the call traffic to the circuit switched network 106, which in turn routes the call traffic to the target user 107.

The phone calls explained in the figures 1-2 are usually referred to as Voice-over-IP phone calls. In the following the SIP-protocol (SIP, Session Initiation Protocol) is explained. The SIP-protocol is an application-layer control and signalling protocol for creating, modifying and terminating Multimedia sessions with one or more participants.

The SIP-protocol sessions include Internet multimedia conferences, Internet telephone calls and multimedia distribution. Members in a session can communicate via multicast or via a mesh of unicast relations, or a combination of these.

SIP invitations used to create sessions carry session descriptions, which allow participants to agree on a set of compatible media types. SIP supports user mobility by proxying and redirecting requests to the user's current location. Users can register their current location.

SIP is not tied to any particular session description protocol. SIP is designed to be independent of the lower-

layer transport protocol and can be extended with additional capabilities.

IETF (IETF, Internet Engineering Task Force) has adopted a
5 standard for a telephone number-based database system
called ENUM. ENUM uses the Internet domain name system
(DNS, Domain Name System) to map telephone numbers to Web
addresses or URLs (URL, Uniform Resource Locator). The
goal of the ENUM standard is to provide a single number to
10 replace the multiple numbers and addresses for an individual's home phone, business phone, fax, cell phone, and e-mail, SIP address, personal WEB page, etc.

IETF has also defined the reference architecture behind
15 the ENUM protocols necessary to implement a telephone number-based Internet database system. For a given telephone number there is defined an extensible set of services to be provided such as IP telephony, store and forward or real-time Internet Fax, Voice messaging, Internet paging.

20

In the ENUM database system an E.164-formatted international telecommunication number has to be mapped into the identity of the service registrar for that number. This may or may not involve more than one referral in DNS. The
25 Internet Domain Name System provides an ideal technology for the ENUM service registrar database due to its hierarchical structure, fast connectionless queries, and distributed administrative model. The ENUM database maps any arbitrary telephone number into one or more URLs.

30

ITU standard E.164 defines the structure of the public telephone number as follows: country code, followed by nationally significant part, followed by sub-address. The country code may be from one to three digits, and the total length may be up to 15 digits. The nationally signifi-
35

cant portion may be arbitrarily divided on any number boundary.

5 The delegation of telephone numbers from the root authority (the ITU) down to individuals is a well-established system. In many countries numbering plans, the divisions are not uniform, that is, the "area codes" or "city codes" may be of varying lengths within a single country and the total number of digits may be variable. The national long-
10 distance access or international dialing prefix sequence is not part of the canonical E.164 number.

ITU standard E.212 defines the structure and format of the public land mobile telephone number as follows: mobile
15 country code, followed by mobile network code, followed by mobile subscriber identification number. The total length may be up to 15 digits.

The above-mentioned two numbering systems are widely in
20 use throughout the world to form telephone numbers. However there can be other systems for defining telephone numbers.

SIP signalling, which will be user in the IP Multimedia
25 network as specified by 3GPP (3GPP, Third generation partnership Project), allows users to be addressed using SIP URLs. From a users perspective, the SIP URL is in the form user@domain, e.g. John.Smith@example.com. In IP Multimedia network as specified by 3GPP, users are identified by an
30 telephone number and one or more SIP URLs.

Mobile terminals are constantly developing. The terminals on the market in a couple of years will probably more resemble notebook/laptop computers than traditional tele-
35 phones. Still these terminals will have capabilities to establish traditional circuit switched calls, e.g. for

voice communication. Also when using traditional circuit switched networks, it would be convenient to use addresses that would be easier to remember than telephone numbers.

5 While the prior art systems and the systems being developed are based on the existing telephone number-based directory system they do not provide a solution for a user having the target user's telephone number not known or misplaced. There is also a need for a solution that would
10 allow the users to easily contact each others without the need of finding out target user's telephone number.

Summary of the present invention

15 It is an object of the present invention to overcome or at least mitigate the disadvantages of the prior art. The present invention provides a system and method for establishing a call in a telecommunications network. The present invention also provides an address translation
20 server, a call routing server and user terminal for establishing a call in a telecommunications network.

According to a first aspect of the present invention there is provided a system for establishing a call in a telecommunications network having a user terminal, a target user
25 and a circuit switched network, said system having translation means for translating a URL to a corresponding telephone number.

30 Preferably the translation means of the said system has receiving means for receiving a translation request carrying a URL, and sending means for sending out a translation response carrying the telephone number corresponding to the received URL, so that the translation means carries
35 out the translation on the basis of the received transla-

tion request. Preferably the translation means of the said system is an Address translation server.

Preferably the user terminal of the said system has sending means for sending out a translation request carrying a URL, and receiving means for receiving a translation response carrying the telephone number corresponding to the sent URL. More preferably the user terminal sending means sends out a translation request carrying a URL to the Address translation server and the user terminal receiving means receives a translation response carrying the telephone number corresponding to the sent URL from the Address translation server.

Preferably the communication between the user terminal and the Address translation server is realized with SMS-messages. Preferably the user terminal of the said system has call establishing means for setting up a call from user terminal to the end user through the circuit switched network using the telephone number corresponding to the sent URL.

Alternatively the user terminal of the said system has sending means for sending out a call setup request carrying a URL, and receiving means for receiving a call setup response carrying the telephone number corresponding to the sent URL. Preferably the telecommunications network of the said system has also a packet switched network, and the user terminal sending means sends out a call setup request carrying a URL to the Address translation server located in a Packet Switched Network and the user terminal receiving means receives a call setup response carrying the telephone number corresponding to the sent URL from the Address translation server.

More preferably the said system has a Call routing server having sending means for sending out a translation request carrying a URL, and receiving means for receiving a translation response carrying the telephone number corresponding to the sent URL. More preferably in the said system the user terminal sending means sends out a call setup request carrying a URL to the Call routing server receiving means, the Call routing server sending means sends a translation request carrying the URL to the Address translation server, and the Address translation server carries out the translation and sends out a translation response carrying the telephone number corresponding to the received URL to the Call routing server receiving means. More preferably in the said system the Call routing server sending means sends out a call setup response carrying the telephone number corresponding to the earlier sent URL to the user terminal receiving means.

Alternatively the said system has a PSTN Gateway having receiving means for receiving a call setup request carrying the telephone number corresponding to the requested URL, and call establishing means for setting up a call from user terminal to the end user. More preferably the Call routing server has call establishing means for setting up a call from user terminal to the end user through the Call routing server and the PSTN Gateway using the telephone number corresponding to the sent URL.

More preferably in the said system, after the Call routing server receives a translation response, the Call routing server sending means sends out a call setup request carrying the telephone number corresponding to the earlier sent URL to the PSTN Gateway receiving means for setting up a call from user terminal to the end user through the Call routing server and the PSTN Gateway. Alternatively, after the Call routing server receives a translation response

carrying the telephone number, the Call routing server sets up the telephone call directly to another user terminal using the telephone number.

5 Preferably in the said system, the Address translation server sends out a translation response carrying the telephone number corresponding to the received URL together with call related information to the Call routing server receiving means, and the Call routing server sending means
10 sends out a call setup response carrying the telephone number corresponding to the received URL together with call related information to the user terminal receiving means.

15 Preferably in the said system, the user terminal has call establishing means for setting up a call from user terminal to the end user either through the circuit switched network or through the Call routing server and the PSTN Gateway, using the telephone number corresponding to the
20 sent URL. More preferably in the said system, the user terminal has deciding means for deciding on whether to set up the call from user terminal to the end user through the circuit switched network or through the Call routing server and the PSTN Gateway.

25 Preferably in the said system the Address translation server and the Call routing server are realized in one server equipment. Alternatively, the Call routing server and the PSTN Gateway are realized in one equipment. Alternatively,
30 the Address translation server, the Call routing server and the PSTN Gateway are all realized in one equipment.

According to a second aspect of the present invention
35 there is provided a method for establishing a call in a telecommunications network having a user terminal, a tar-

get user, and a circuit switched network, said method comprising the steps of

- sending a translation request carrying a URL to a translation means,
- 5 - translating a URL to a corresponding telephone number in the translation means,
- sending a translation response carrying the telephone number corresponding to the received URL from the translation means to the user terminal, and
- 10 - setting up a telephone call from user terminal to the end user through the circuit switched network using the telephone number corresponding to the sent URL.

Preferably, the translation means sends call related information together with the telephone number to the user terminal. More preferably, the user terminal decides whether or not to set up the call to the target user after receiving call related information from the translation means.

20

According to a third aspect of the present invention there is provided a method for establishing a call in a telecommunications network having a user terminal, a target user, a circuit switched network, and a packet switched network, said method comprising the steps of

- sending a call setup request carrying a URL to a Call routing server located in the Packet Switched Network,
- sending a translation request carrying a URL to the translation means located in the Packet Switched Network,
- 30 - translating a URL to a corresponding telephone number in the translation means,
- sending a translation response carrying the telephone number corresponding to the received URL from the translation means to the Call routing server, and
- 35 - setting up a telephone call from the user terminal to the end user via a PSTN Gateway located between the Packet

Switched Network by sending a call setup response carrying the telephone number corresponding to the received URL from the Call routing server to the PSTN Gateway.

5 Preferably, the translation means sends call related information together with the telephone number to the Call routing server. More preferably, the Call routing server decides whether or not to set up the call to the target user after receiving call related information from the
10 translation means.

According to a fourth aspect of the present invention there is provided a method for establishing a call in a telecommunications network having a user terminal, a target user, a circuit switched network, and a packet
15 switched network, said method comprising the steps of

- sending a call setup request carrying a URL to a Call routing server located in the Packet Switched Network,
- sending a translation request carrying a URL to the
20 translation means located in the Packet Switched Network,
- translating a URL to a corresponding telephone number in the translation means,
- sending a translation response carrying the telephone number corresponding to the received URL from the translation means to the Call routing server,
25
- sending a call setup response carrying the telephone number corresponding to the received URL from the Call routing server to the user terminal, and
- setting up a telephone call from user terminal to the
30 end user using the telephone number corresponding to the sent URL.

Preferably, the translation means sends call related information together with the telephone number to the user
35 terminal via the Call routing server. More preferably, the user terminal decides whether or not to set up the call to

the target user after receiving call related information from the translation means via the Call routing server.

Preferably, after receiving call related information, the user terminal decides whether to

- set up the call to the target user via the circuit switched network, or to
- set up the telephone call via the Call routing server and the PSTN Gateway.

10

According to a fifth aspect of the present invention there is provided an address translation server in a system for establishing a call in a telecommunications network, the telecommunications network having a user terminal, a target user and a circuit switched network, wherein the said address translation server translates a URL to a corresponding telephone number.

Preferably, the said Address translation server has receiving means for receiving a translation request carrying a URL, and sending means for sending out a translation response carrying the telephone number corresponding to the received URL, so that the said Address translation server carries out the translation on the basis of the received translation request.

Preferably, the said Address translation server sends out call related information together with a translation response carrying the telephone number corresponding to the received URL.

According to a sixth aspect of the present invention there is provided a call routing server in a system for establishing a call in a telecommunications network, the telecommunications network having a user terminal, a target user a circuit switched network and a packet switched net-

work, wherein the Call routing server has sending means for sending out a translation request carrying a URL, and receiving means for receiving a translation response carrying the telephone number corresponding to the sent URL.

5

Preferably, the said Call routing server has deciding means for deciding on whether to proceed in setting up the call from user terminal to the end user, or whether to send out a translation response carrying the telephone
10 number corresponding to the earlier sent URL to the user terminal receiving means. Preferably, the said Call routing server receiving means is set up to receive call related preferences from the user terminal.

15 Preferably, the said Call routing server has deciding means for deciding on whether to set up the call from user terminal to the end user through the circuit switched network or through the Call routing server and the PSTN Gateway. More preferably, the said Call routing server decid-
20 ing means makes the decision on the call setup on the basis of the call related preferences received from the user terminal and the translation response.

Preferably, the said Call routing server has instructing
25 means for instructing the user terminal on how to proceed with setting up the call from user terminal to the end user. Preferably, the user terminal sending means sends a call setup request carrying a URL to Call routing server receiving means, the Call routing server sending means
30 sends a translation request carrying the URL to Address translation server, the Address translation server carries out the translation and sends out a translation response carrying the telephone number corresponding to the received URL to the Call routing server receiving means, and
35 the Call routing server sending means sends out a call setup response carrying the telephone number corresponding

to the earlier sent URL to the user terminal receiving means.

Alternatively, the user terminal sending means sends a
5 call setup request carrying a URL to Call routing server
receiving means, the Call routing server sending means
sends a translation request carrying the URL to Address
translation server, the Address translation server carries
10 out the translation and sends out a translation response
carrying the telephone number corresponding to the re-
ceived URL to the Call routing server receiving means, and
the Call routing server sending means forwards a call
setup request carrying the telephone number corresponding
to the earlier sent URL to a PSTN Gateway located between
15 the Packet Switched Network and the circuit switched net-
work.

Alternatively, the user terminal sending means sends a
call setup request carrying a URL to Call routing server
20 receiving means, the Call routing server sending means
sends a translation request carrying the URL to Address
translation server, the Address translation server carries
out the translation and sends out a translation response
carrying the telephone number corresponding to the re-
25 ceived URL to the Call routing server receiving means, and
after the Call routing server receives a translation re-
sponse, the Call routing server sets up the telephone call
directly to another user terminal.

30 According to a seventh aspect of the present invention
there is provided a user terminal in a system for estab-
lishing a call in a telecommunications network, the tele-
communications network having a target user, and a circuit
switched network, the said user terminal having sending
35 means for sending out a translation request carrying a
URL, and receiving means for receiving a translation re-

sponse carrying the telephone number corresponding to the sent URL.

Preferably, the user terminal sending means sends out a
5 translation request carrying a URL to an Address translation server and the user terminal receiving means receives a translation response carrying the telephone number corresponding to the sent URL from the Address translation server. Preferably, the user terminal receiving means re-
10 ceives call related information together with a translation response carrying the telephone number corresponding to the earlier sent URL.

Preferably, the user terminal has call establishing means
15 for setting up a call from user terminal to the end user. Preferably, the user terminal has deciding means for deciding on whether to proceed in setting up the call from user terminal to the end user. Preferably, the user terminal sending means set up for forwarding the telephone num-
20 ber and call related information to the user application, and that the user terminal receiving means is set up for receiving instructions from the user application.

Alternatively, the user terminal has presenting means for
25 presenting the telephone number and call related information to the user, and recording means for recording instructions given by the user. Preferably, the user terminal recording means records a translation request carrying a URL given by the user and the user terminal presenting
30 means presents a translation response carrying the telephone number corresponding to the sent URL and call related information to the user.

According to a eighth aspect of the present invention
35 there is provided a user terminal in a system for establishing a call in a telecommunications network, the tele-

communications network having a target user, a circuit switched network, and a packet switched network, the said user terminal having sending means for sending out a translation request carrying a URL, and receiving means
5 for receiving a translation response carrying the telephone number corresponding to the sent URL.

Preferably, the user terminal sending means sends a call setup request carrying the URL to a Call routing server
10 located in a Packet Switched Network and the user terminal receiving means receives a call setup response carrying the telephone number corresponding to the sent URL and call related information from the Call routing server.

15 Preferably, the user terminal receiving means receives call related information together with a call setup response carrying the telephone number corresponding to the earlier sent URL. Preferably, the user terminal has call establishing means for setting up a call from user terminal
20 to the end user.

Preferably, the said user terminal has deciding means for deciding on whether to proceed in setting up the call from user terminal to the end user. Preferably, the said user
25 terminal has deciding means for deciding on whether to set up the call from user terminal to the end user through the circuit switched network or through the Call routing server and the PSTN Gateway.

30 Preferably, the user terminal receiving means is set up for receiving instructions from the Call routing server. Alternatively, the said user terminal has forwarding means for forwarding call related preferences to the Call routing server. Preferably, the user terminal forwarding means
35 forwards a call setup request carrying a URL given by the

user and call related preferences to the Call routing server.

Preferably, the user terminal sending means is set up for forwarding the telephone number and call related information to the user application, and that the user terminal receiving means is set up for receiving instructions from the user application.

Alternatively, the user terminal has presenting means for presenting the telephone number and call related information to the user, and recording means for recording instructions given by the user. Preferably, the user terminal recording means records a call setup request carrying a URL given by the user and the user terminal presenting means presents a call setup response carrying the telephone number corresponding to the sent URL and call related information to the user.

Brief description of the drawings

For a better understanding of the present invention and in order to show how the same may be carried into effect reference will now be made to the accompanying drawings, in which:

Figure 1 illustrates a prior art telephone call made over a packet switched network,

Figure 2 illustrates a telephone call made over a packet switched network with a prior art advanced user terminal,

Figure 3 is a block diagram illustrating a system for establishing a call according to the present invention,

Figure 4 is a flowchart illustrating a method for establishing a call from the perspective of a user terminal according to the present invention,

Figure 5 is a block diagram illustrating another example of a system for establishing a call according to the present invention,

Figure 6 is a flowchart illustrating another example
5 of a method for establishing a call from the perspective of a call routing server according to the present invention,

Figure 7 is a block diagram illustrating third example of a system for establishing a call according to the
10 present invention,

Figure 8 is a flowchart illustrating third example of a method for establishing a call from the perspective of a call routing server according to the present invention,

Figure 9 is a flowchart illustrating fourth example
15 of a method for establishing a call from the perspective of a call routing server according to the present invention.

The Figures 1-2 referring to the prior art have been discussed earlier. In the following, reference is made to the
20 Figures 3-9.

Detailed description of certain embodiments

Figure 3 is a block diagram illustrating a system for establishing a call according to the present invention. In the system according to the present invention there is a user terminal 301 initiating a telephone call to target user 107. The user terminal 301 can for example be a PC
30 301, a second generation mobile terminal 301 (e.g. GSM terminal, GPRS terminal, etc.) or a third generation mobile terminal 301.

In the system according to the present invention there is
35 also an address translation server 302. The user terminal 301 sends a translation request carrying a URL (e.g. SIP

URL) to the Address translation server 302. The Address translation server 302 retrieves the telephone number corresponding the received URL from its database and sends a translation response carrying this telephone number to the user terminal 301. The communication between the user terminal 301 and the address translation server 302 can be realized for example with SMS-messages (SMS, Short Message Service).

10 The user terminal 301 then contacts the circuit switched network 106 e.g. PSTN network 106 (PSTN, Public Switched Telephone Network) or PLMN network 106 (PLMN, Public Land Mobile Network) and sets up the telephone call to the target user 107.

15

Figure 4 is a flowchart illustrating a method for establishing a call from the perspective of a user terminal according to the present invention. In the method according to the present invention there is a user terminal 301 initiating a telephone call to target user 107. In the method according to the present invention there is also an Address translation server 302.

The user terminal 301 sends 401 a translation request carrying a URL (e.g. SIP URL) to the Address translation server 302. Next the user terminal 301 receives 402 a translation response carrying the retrieved telephone number corresponding the sent URL from the Address translation server 302. Address translation server 302 can also send call related information together with the telephone number to the user terminal 301.

The user terminal 301 then decides 403 whether or not to set up the call. If the call is to be set up, the user terminal 301 then contacts the circuit switched network

106 e.g. PSTN network 106 or PLMN network 106 and sets up
404 the telephone call to the target user 107.

Figure 5 is a block diagram illustrating another example
5 of a system for establishing a call according to the pre-
sent invention. In the other example of a system according
to the present invention there is a user terminal 501 ini-
tiating a telephone call to target user 107. The user ter-
minal 501 can for example be a PC 501, GPRS terminal 501,
10 a special-dedicated IP telephony terminal 501 or a third
generation mobile terminal 501.

In the other example of a system according to the present
invention there is also an Address translation server 502
15 and a Call routing server 503 that are located in the
Packet Switched Network 104 and a PSTN Gateway 504 that is
located between the Packet Switched Network 104 and the
circuit switched network 106. The user terminal 501 sends
a call setup request carrying a URL (e.g.
20 John.Doe@example.com) to the Call routing server 503.

The Call routing server 503 sends a translation request
carrying the URL to the Address translation server 502.
The Address translation server 502 retrieves the telephone
25 number corresponding the received URL from its database
and sends a translation response carrying the retrieved
telephone number corresponding the sent URL to the Call
routing server 503. The Call routing server 503 forwards a
call setup response carrying the retrieved telephone num-
30 ber corresponding the sent URL to the user terminal 501.

The user terminal 501 then contacts the circuit switched
network 106 e.g. PSTN network 106 or PLMN network 106 and
sets up the telephone call to the target user 107. Alter-
35 natively when circuit switched network 106 is not pre-

ferred the user terminal 501 sets up the telephone call via the Call routing server 503 and the PSTN Gateway 504.

Figure 6 is a flowchart illustrating another example of a method for establishing a call from the perspective of a call routing server according to the present invention. In the other example of a method according to the present invention there is a user terminal 501 initiating a telephone call to target user 107.

10

In the other example of a method according to the present invention there is also an Address translation server 502 and a Call routing server 503 that are located in the Packet Switched Network 104.

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The Call routing server 503 receives 601 URL (e.g. John.Doe@example.com) sent by the user terminal 501. The Call routing server 503 sends 602 a translation request carrying the URL to the Address translation server 502.

20

Next the Call routing server 503 receives 603 a translation response carrying the retrieved telephone number corresponding the sent URL from the Address translation server 502.

25

The Call routing server 503 then forwards 604 a call setup response carrying the retrieved telephone number corresponding the sent URL to the user terminal 501. Address translation server 502 can also send call related information to the Call routing server 503 which information is also forwarded together with the telephone number to the user terminal 501. The call related information can consist of various types of information relating to a call e.g. tariff information, information on the Quality of Service, congestion information or information on capabilities and features needed for call setup.

35

The user terminal 501 then decides 605 whether or not to set up the call. If the call is to be set up, the user terminal 501 then contacts the circuit switched network 106 e.g. PSTN network 106 or PLMN network 106 and sets up
5 606 the telephone call to the target user 107.

Figure 7 is a block diagram illustrating third example of a system for establishing a call according to the present invention. In the third example of a system according to
10 the present invention there is a user terminal 701 initiating a telephone call to target user 107. The user terminal 701 can for example be a PC 701, GPRS terminal 701, a special-dedicated IP telephony terminal 701 or a third generation mobile terminal 701.

15

In the third example of a system according to the present invention there is also an Address translation server 702 and a Call routing server 703 that are located in the Packet Switched Network 104 and a PSTN Gateway 704 that is
20 located between the Packet Switched Network 104 and the circuit switched network 106. The user terminal 701 sends a call setup request carrying a URL (e.g. John.Doe@example.com) to the Call routing server 703.

25 The Call routing server 703 sends a translation request carrying the URL to the Address translation server 702. The Address translation server 702 retrieves the telephone number corresponding the received URL from its database and sends a translation response carrying this telephone
30 number to the Call routing server 703.

The Call routing server 703 sends a call setup request carrying the retrieved telephone number corresponding the sent URL to the PSTN Gateway 704. The PSTN Gateway 704
35 contacts the circuit switched network 106 e.g. PSTN network 106 or PLMN network 106 and sets up the telephone

call to the target user 107. Alternatively Call routing server 703 can setup the telephone call directly to another user terminal 705.

5 Figure 8 is a flowchart illustrating third example of a method for establishing a call from the perspective of a call routing server according to the present invention. In the third example of a method according to the present invention there is a user terminal 701 initiating a tele-
10 phone call to target user 107.

In the third example of a method according to the present invention there is also an Address translation server 702 and a Call routing server 703 that are located in the
15 Packet Switched Network 104 and a PSTN Gateway 704 that is located between the Packet Switched Network 104 and the circuit switched network 106.

The Call routing server 703 receives 801 a call setup request carrying a URL (e.g. John.Doe@example.com) sent by
20 the user terminal 701. The Call routing server 703 sends 802 a translation request carrying the URL to the Address translation server 802. Next the Call routing server 703 receives 803 a translation response carrying the retrieved
25 telephone number corresponding the sent URL from the Address translation server 702.

The Call routing server 703 then forwards a call setup request carrying the retrieved telephone number corresponding
30 the sent URL to the PSTN Gateway 704 and sets up the telephone call to the target user 107 via the PSTN Gateway 704.

Figure 9 is a flowchart illustrating fourth example of a
35 method for establishing a call from the perspective of a call routing server according to the present invention. In

the fourth example of a method according to the present invention there is a user terminal 701 initiating a telephone call to target user 107.

- 5 In the fourth example of a method according to the present invention there is also an Address translation server 702 and a Call routing server 703 that are located in the Packet Switched Network 104 and a PSTN Gateway 704 that is located between the Packet Switched Network 104 and the
10 circuit switched network 106.

The Call routing server 703 receives 901 a call setup request carrying a URL (e.g. John.Doe@example.com) sent by the user terminal 701. The Call routing server 703 sends
15 902 a translation request carrying the URL to the Address translation server 802. Next the Call routing server 703 receives 903 a translation response carrying the telephone number corresponding to the received URL together with call related information from the Address translation
20 server 702.

The Call routing server 703 then forwards 904 a call setup response carrying the retrieved telephone number corresponding the sent URL together with call related information to the user terminal 701. Next the user terminal 701
25 decides 905 how to set up the call to target user 107. When circuit switched network 106 is preferred the user terminal 701 sets up 907 the telephone call via the circuit switched network 106. Alternatively when circuit
30 switched network 106 is not preferred the user terminal 701 sets up 908 the telephone call via the Call routing server 703 and the PSTN Gateway 704.

With the help of the solution according to the present invention also the users of a traditional circuit switched
35 networks can use convenient addresses in the form of

user@domain when addressing target users. The main advantage of using a new type of addressing is that it is considerably easier to remember than telephone numbers. The solution according to the present invention also makes the migration to IP multimedia networks easier for network operators.

The solution according to the present invention provides a solution for a user having the target user's telephone number not known or misplaced.

Claims

1. A system for establishing a call in a telecommunications network having
- 5 - a user terminal (301), (501), (701),
- a target user (107), and
- a circuit switched network (106),
characterized in that the system has translation means for translating a URL to a corresponding telephone number.
- 10
2. A call establishing system according to claim 1,
characterized in that the translation means has
- receiving means for receiving a translation request carrying a URL, and
- 15 - sending means for sending out a translation response carrying the telephone number corresponding to the received URL,
and that the translation means carries out the translation on the basis of the received translation request.
- 20
3. A call establishing system according to claim 1 or claim 2, **characterized in that** the translation means is a Address translation server (302), (502), (702).
- 25
4. A call establishing system according to any of the claims 1-3, **characterized in that** the user terminal (301), has
- sending means for sending out a translation request carrying a URL, and
- 30 - receiving means for receiving a translation response carrying the telephone number corresponding to the sent URL.
5. A call establishing system according to claim 4,
- 35 **characterized in that**

- the user terminal (301) sending means sends out a translation request carrying a URL to the Address translation server (302) and that
- the user terminal (301) receiving means receives a translation response carrying the telephone number corresponding to the sent URL from the Address translation server (302).

6. A call establishing system according to any of the claims 1-5, **characterized in that** the communication between the user terminal (301) and the Address translation server (302) is realized with SMS-messages.

7. A call establishing system according to any of the claims 1-6, **characterized in that** the user terminal (301) has call establishing means for setting up a call from user terminal (301) to the end user (107) through the circuit switched network (104) using the telephone number corresponding to the sent URL.

8. A call establishing system according to any of the claims 1-3, **characterized in that** the user terminal (501), (701), has

- sending means for sending out a call setup request carrying a URL, and
- receiving means for receiving a call setup response carrying the telephone number corresponding to the sent URL.

9. A call establishing system according to claim 8, **characterized in that** the telecommunications network has also a packet switched network (104), and that

- the user terminal (501), (701) sending means sends out a call setup request carrying a URL to the Address translation server (502), (702) located in the Packet Switched Network (104) and that

- the user terminal (501), (701) receiving means receives a call setup response carrying the telephone number corresponding to the sent URL from the Address translation server (502), (702).

5

10. A call establishing system according to claim 9, **characterized in that** the system has a Call routing server (503), (703) that has

- sending means for sending out a translation request carrying a URL, and
10 - receiving means for receiving a translation response carrying the telephone number corresponding to the sent URL.

15 11. A call establishing system according to claim 10, **characterized in that**

- the user terminal (501), (701) sending means sends out a call setup request carrying a URL to the Call routing server (503), (703) receiving means,
20 - the Call routing server (503), (703) sending means sends a translation request carrying the URL to the Address translation server (502), (702), and
- the Address translation server (502), (702) carries out the translation and sends out a translation response
25 carrying the telephone number corresponding to the received URL to the Call routing server (503), (703) receiving means.

12. A call establishing system according to claim 11, **characterized in that** the Call routing server (503) sending means sends out a call setup response carrying the telephone number corresponding to the earlier sent URL to the user terminal (501) receiving means.
30

13. A call establishing system according to claim 11,
characterized in that the system has a PSTN Gateway (504),
(704) that has
- receiving means for receiving a call setup request
- 5 carrying the telephone number corresponding to the re-
quested URL, and
- call establishing means for setting up a call from
user terminal (701) to the end user (107).
- 10 14. A call establishing system according to claim 13,
characterized in that the Call routing server (503), (703)
has call establishing means for setting up a call from
user terminal (501), (701) to the end user (107) through
the Call routing server (503), (703) and the PSTN Gateway
15 (504), (704), using the telephone number corresponding to
the sent URL.
15. A call establishing system according to claim 14,
characterized in that after the Call routing server (503),
20 (703) receives a translation response, the Call routing
server (503) sending means sends out a call setup request
carrying the telephone number corresponding to the earlier
sent URL to the PSTN Gateway (504), (704) receiving means
for setting up a call from user terminal (501), (701) to
25 the end user (107) through the Call routing server (503),
(703) and the PSTN Gateway (504), (704).
16. A call establishing system according to claim 14,
characterized in that after the Call routing server (703)
30 receives a translation response carrying the telephone
number, the Call routing server (703) sets up the tele-
phone call directly to another user terminal (705) using
the telephone number.
- 35 17. A call establishing system according to any of the
claims 10-16, **characterized in that**

- the Address translation server (502), (702) sends out a translation response carrying the telephone number corresponding to the received URL together with call related information to the Call routing server (503), (703) receiving means, and that

- the Call routing server (503) sending means sends out a call setup response carrying the telephone number corresponding to the received URL together with call related information to the user terminal (501) receiving means.

10

18. A call establishing system according to any of the claims 9-17, **characterized in that** the user terminal (501), (701) has call establishing means for setting up a call from user terminal (501), (701) to the end user (107) either through the circuit switched network (106) or through the Call routing server (503), (703) and the PSTN Gateway (504), (704), using the telephone number corresponding to the sent URL.

20 19. A call establishing system according to claim 18, **characterized in that** the user terminal (501), (701) has deciding means for deciding on whether to set up the call from user terminal (501), (701) to the end user (107) through the circuit switched network (106) or through the Call routing server (503), (703) and the PSTN Gateway (504), (704).

20. A call establishing system according to any of the claims 10-19, **characterized in that** the Address translation server (502), (702) and the Call routing server (503), (703) are realized in one server equipment.

21. A call establishing system according to any of the claims 13-19, **characterized in that** the Call routing server (503), (703) and the PSTN Gateway (504), (704) are realized in one equipment.

22. A call establishing system according to any of the claims 13-19, **characterized in that** the Address translation server (502), (702), the Call routing server (503),
5 (703) and the PSTN Gateway (504), (704) are all realized in one equipment.

23. A method for establishing a call in a telecommunications network, the telecommunications network having
10 - a user terminal (301),
- a target user (107), and
- a circuit switched network (106),
characterized in that the method comprises the steps of
- sending (401) a translation request carrying a URL to
15 a translation means (302),
- translating a URL to a corresponding telephone number in the translation means (302),
- sending (402) a translation response carrying the telephone number corresponding to the received URL from
20 the translation means (302) to the user terminal (301),
and
- setting up (404) a telephone call from user terminal (301) to the end user (107) through the circuit switched network (106) using the telephone number corresponding to
25 the sent URL.

24. A method according to claim 23, **characterized in that** the translation means (302) sends call related information together with the telephone number to the user terminal (301).
30

25. A method according to claim 24, **characterized in that** the user terminal (301) decides (403) whether or not to set up the call to the target user (107) after receiving call related information from the translation means (302).
35

26. A method for establishing a call in a telecommunications network, the telecommunications network having

- a user terminal (701),
- 5 - a target user (107),
- a circuit switched network (106), and
- a packet switched network (104),

characterized in that the method comprises the steps of

- sending (801) a call setup request carrying a URL to
- 10 a Call routing server (703) located in the Packet Switched Network (104),
- sending (802) a translation request carrying a URL to the translation means (702) located in the Packet Switched Network (104),
- 15 - translating a URL to a corresponding telephone number in the translation means (702),
- sending (803) a translation response carrying the telephone number corresponding to the received URL from the translation means (702) to the Call routing server
- 20 (703), and
- setting up (804) a telephone call from the user terminal (701) to the end user (107) via a PSTN Gateway (704) located between the Packet Switched Network (104) by sending (804) a call setup response carrying the telephone
- 25 number corresponding to the received URL from the Call routing server (703) to the PSTN Gateway (704).

27. A method according to claim 26, **characterized in that** the translation means (702) sends call related information together with the telephone number to the Call

30 routing server (703).

28. A method according to claim 27, **characterized in that** the Call routing server (703) decides whether or not

35 to set up the call to the target user (107) after receiv-

ing call related information from the translation means (702).

29. A method for establishing a call in a telecommunications network, the telecommunications network having
- a user terminal (501), (701),
 - a target user (107),
 - a circuit switched network (106), and
 - a packet switched network (104),
- 10 **characterized in that** the method comprises the steps of
- sending (601), (901) a call setup request carrying a URL to a Call routing server (503), (703) located in the Packet Switched Network (104),
 - sending (602), (902) a translation request carrying a
 - 15 URL to the translation means (502), (702) located in the Packet Switched Network (104),
 - translating a URL to a corresponding telephone number in the translation means (502), (702),
 - sending (603), (903) a translation response carrying
 - 20 the telephone number corresponding to the received URL from the translation means (502), (702) to the Call routing server (503), (703),
 - sending (604), (904) a call setup response carrying the telephone number corresponding to the received URL
 - 25 from the Call routing server (503), (703) to the user terminal (501), (701), and
 - setting up (606), (907), (908) a telephone call from user terminal (301) to the end user (107) using the telephone number corresponding to the sent URL.

30

30. A method according to claim 29, **characterized in that** the translation means (502), (702) sends call related information together with the telephone number to the user terminal (501), (701) via the Call routing server (503),
- 35 (703).

31. A method according to claim 30, **characterized in that** the user terminal (501), (701) decides (605), (905) whether or not to set up the call to the target user (107) after receiving call related information from the translation means (502), (702) via the Call routing server (503), (703).

32. A method according to any of the claims 29-31, **characterized in that** after receiving call related information, the user terminal (501), (701) decides (906) whether to

- set up (907) the call to the target user (107) via the circuit switched network (106), or to
- set up (908) the telephone call via the Call routing server (503), (703) and the PSTN Gateway (504), (704).

33. An address translation server in a system for establishing a call in a telecommunications network, the telecommunications network having

- a user terminal (301), (501), (701),
- a target user (107), and
- a circuit switched network (106),

characterized in that the Address translation server (302), (502), (702) translates a URL to a corresponding telephone number.

34. An address translation server according to claim 33, **characterized in that** the Address translation server (302), (502), (702) has

- receiving means for receiving a translation request carrying a URL, and
- sending means for sending out a translation response carrying the telephone number corresponding to the received URL,

and that the Address translation server (302), (502), (702) carries out the translation on the basis of the received translation request.

- 5 35. An address translation server according to any of the claims 33-34, **characterized in that** the Address translation server (502), (702) sends out call related information together with a translation response carrying the telephone number corresponding to the received URL.
- 10 36. A call routing server in a system for establishing a call in a telecommunications network, the telecommunications network having
- a user terminal (501), (701),
 - 15 - a target user (107),
 - a circuit switched network (106), and
 - a packet switched network (104),
- characterized in that** the Call routing server (503), (703) has
- 20 - sending means for sending out a translation request carrying a URL, and
 - receiving means for receiving a translation response carrying the telephone number corresponding to the sent URL.
- 25 37. A call routing server according to claim 36, **characterized in that** the Call routing server (503), (703) has
- deciding means for deciding on whether to proceed in setting up the call from user terminal (501), (701) to the
 - 30 end user (107), or whether to send out a translation response carrying the telephone number corresponding to the earlier sent URL to the user terminal (501), (701) receiving means.
- 35 38. A call routing server according to any of the claims 36-37, **characterized in that** Call routing server (503),

(703) receiving means is set up to receive call related preferences from the user terminal (501), (701).

39. A call routing server according to any of the claims
5 36-38, **characterized in that** the Call routing server
(503), (703) has
- deciding means for deciding on whether to set up the
call from user terminal (501), (701) to the end user (107)
through the circuit switched network (106) or through the
10 Call routing server (503), (703) and the PSTN Gateway
(504), (704).

40. A call routing server according to claim 39, **charac-**
terized in that the Call routing server (503), (703) de-
15 ciding means makes the decision on the call setup on the
basis of the call related preferences received from the
user terminal (501), (701) and the translation response.

41. A call routing server according to any of the claims
20 36-40, **characterized in that** the Call routing server
(503), (703) has
- instructing means for instructing the user terminal
(501), (701) on how to proceed with setting up the call
from user terminal (501), (701) to the end user (107).

25

42. A call routing server according to any of the claims
36-41, **characterized in that**
- the user terminal (501), (701) sending means sends a
call setup request carrying a URL to Call routing server
30 (503), (703) receiving means,
- the Call routing server (503), (703) sending means
sends a translation request carrying the URL to Address
translation server (502), (702),
- the Address translation server (502), (702) carries
35 out the translation and sends out a translation response
carrying the telephone number corresponding to the re-

ceived URL to the Call routing server (503), (703) receiving means, and that

- the Call routing server (503) sending means sends out a call setup response carrying the telephone number corresponding to the earlier sent URL to the user terminal (501) receiving means.

43. A call routing server according to any of the claims 36-41, **characterized in that**

- 10 - the user terminal (501), (701) sending means sends a call setup request carrying a URL to Call routing server (503), (703) receiving means,
 - the Call routing server (503), (703) sending means sends a translation request carrying the URL to Address translation server (502), (702), and
 - 15 - the Address translation server (502), (702) carries out the translation and sends out a translation response carrying the telephone number corresponding to the received URL to the Call routing server (503), (703) receiving means, and that
 - 20 - the Call routing server (503), (703) sending means forwards a call setup request carrying the telephone number corresponding to the earlier sent URL to a PSTN Gateway (504), (704) located between the Packet Switched Network (104) and the circuit switched network (106).

44. A call routing server according to any of the claims 36-41, **characterized in that**

- 30 - the user terminal (701) sending means sends a call setup request carrying a URL to Call routing server (703) receiving means,
 - the Call routing server (703) sending means sends a translation request carrying the URL to Address translation server (702), and
 - 35 - the Address translation server (702) carries out the translation and sends out a translation response carrying

the telephone number corresponding to the received URL to the Call routing server (703) receiving means, and that

- after the Call routing server (703) receives a translation response, the Call routing server (703) sets up the

5 telephone call directly to another user terminal (705).

45. A user terminal in a system for establishing a call in a telecommunications network, the telecommunications network having

- 10 - a target user (107), and
- a circuit switched network (106),

characterized in that the user terminal (301) has

- sending means for sending out a translation request carrying a URL, and
- 15 - receiving means for receiving a translation response carrying the telephone number corresponding to the sent URL.

46. A user terminal according to claim 45, **characterized**

20 **in that**

- the user terminal (301) sending means sends out a translation request carrying a URL to an Address translation server (302) and that
- the user terminal (301) receiving means receives a

25 translation response carrying the telephone number corresponding to the sent URL from the Address translation server (302).

47. A user terminal according to claim 45 or to claim

30 46, **characterized in that**

- the user terminal (301) receiving means receives call related information together with a translation response carrying the telephone number corresponding to the earlier sent URL.

48. A user terminal according to any of the claims 45-47, **characterized in that** the user terminal (301) has call establishing means for setting up a call from user terminal (301) to the end user (107).

5

49. A user terminal according to any of the claims 45-48, **characterized in that** the user terminal (301) has deciding means for deciding on whether to proceed in setting up the call from user terminal (301) to the end user

10 (107).

50. A user terminal according to any of the claims 45-49, **characterized in that** the user terminal (301) sending means set up for forwarding the telephone number and call related information to the user application, and that the user terminal (301) receiving means is set up for receiving instructions from the user application.

15

51. A user terminal according to any of the claims 45-49, **characterized in that** the user terminal (301) has

- presenting means for presenting the telephone number and call related information to the user, and
- recording means for recording instructions given by the user.

25

52. A user terminal according to claim 51, **characterized in that**

- the user terminal (301) recording means records a translation request carrying a URL given by the user and that

30

- the user terminal (301) presenting means presents a translation response carrying the telephone number corresponding to the sent URL and call related information to the user.

35

53. A user terminal in a system for establishing a call in a telecommunications network, the telecommunications network having

- a target user (107), and
- 5 - a circuit switched network (106), and
- a packet switched network (104),

characterized in that the user terminal (501), (701) has

- sending means for sending out a translation request carrying a URL, and
- 10 - receiving means for receiving a translation response carrying the telephone number corresponding to the sent URL.

54. A user terminal according to claim 53, **characterized**
15 **in that**

- the user terminal (501), (701) sending means sends a call setup request carrying the URL to a Call routing server (503), (703) located in a Packet Switched Network (104) and that
- 20 - the user terminal (501), (701) receiving means receives a call setup response carrying the telephone number corresponding to the sent URL and call related information from the Call routing server (503), (703).

55. A user terminal according to claim 53 or to claim 54, **characterized in that**

- the user terminal (501), (701) receiving means receives call related information together with a call setup response carrying the telephone number corresponding to
30 the earlier sent URL.

56. A user terminal according to any of the claims 53-55, **characterized in that** the user terminal (501), (701) has call establishing means for setting up a call from
35 user terminal (501), (701) to the end user (107).

57. A user terminal according to any of the claims 53-56, **characterized in that** the user terminal (501), (701) has deciding means for deciding on whether to proceed in setting up the call from user terminal (501), (701) to the
5 end user (107).

58. A user terminal according to any of the claims 53-57, **characterized in that** the user terminal (501), (701) has deciding means for deciding on whether to set up the
10 call from user terminal (501), (701) to the end user (107) through the circuit switched network (106) or through the Call routing server (503), (703) and the PSTN Gateway (504), (704).

15 59. A user terminal according to any of the claims 53-58, **characterized in that** the user terminal (501), (701) receiving means is set up for receiving instructions from the Call routing server (503), (703).

20 60. A user terminal according to any of the claims 53-58, **characterized in that** the user terminal (501), (701) has forwarding means for forwarding call related preferences to the Call routing server (503), (703).

25 61. A user terminal according to claim 60, **characterized in that** the user terminal (501), (701) forwarding means forwards a call setup request carrying a URL given by the user and call related preferences to the Call routing server (503), (703).

30

62. A user terminal according to any of the claims 53-61, **characterized in that** the user terminal (501), (701) sending means set up for forwarding the telephone number and call related information to the user application, and
35 that the user terminal (501), (701) receiving means is set up for receiving instructions from the user application.

63. A user terminal according to any of the claims 53-61, **characterized in that** the user terminal (501), (701) has

- 5 - presenting means for presenting the telephone number and call related information to the user, and
 - recording means for recording instructions given by the user.

10 64. A user terminal according to claim 63, **characterized in that**

- the user terminal (501), (701) recording means records a call setup request carrying a URL given by the user and that
15 - the user terminal (501), (701) presenting means presents a call setup response carrying the telephone number corresponding to the sent URL and call related information to the user.

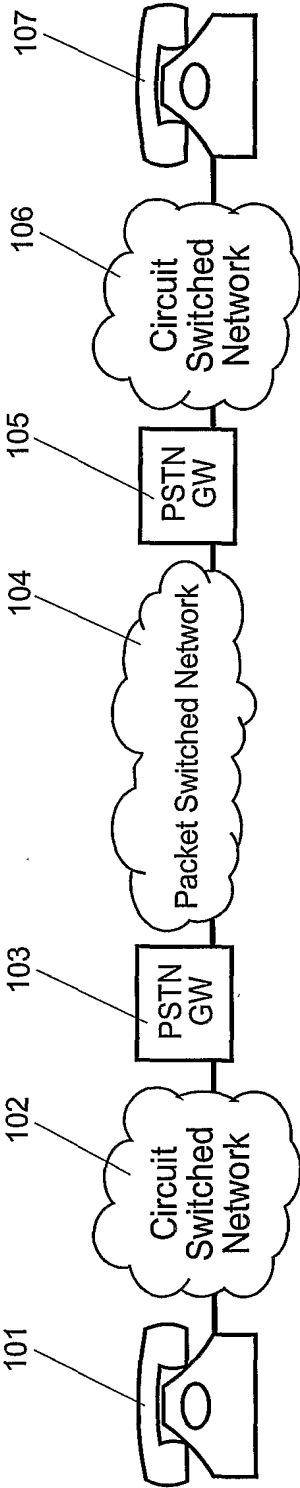


Fig. 1

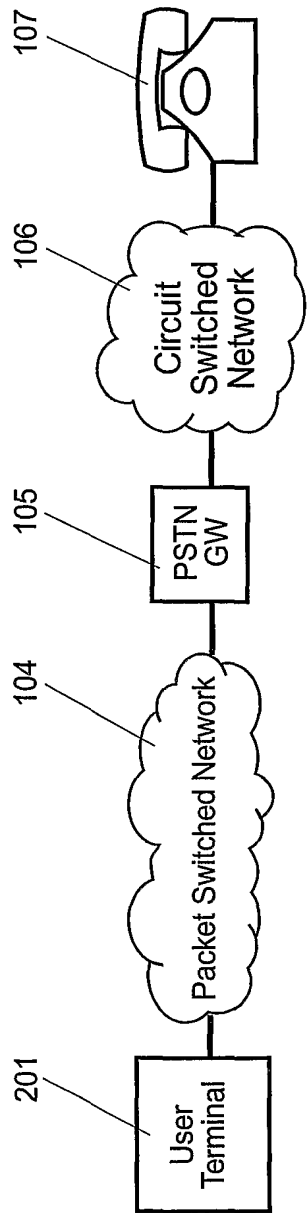


Fig. 2

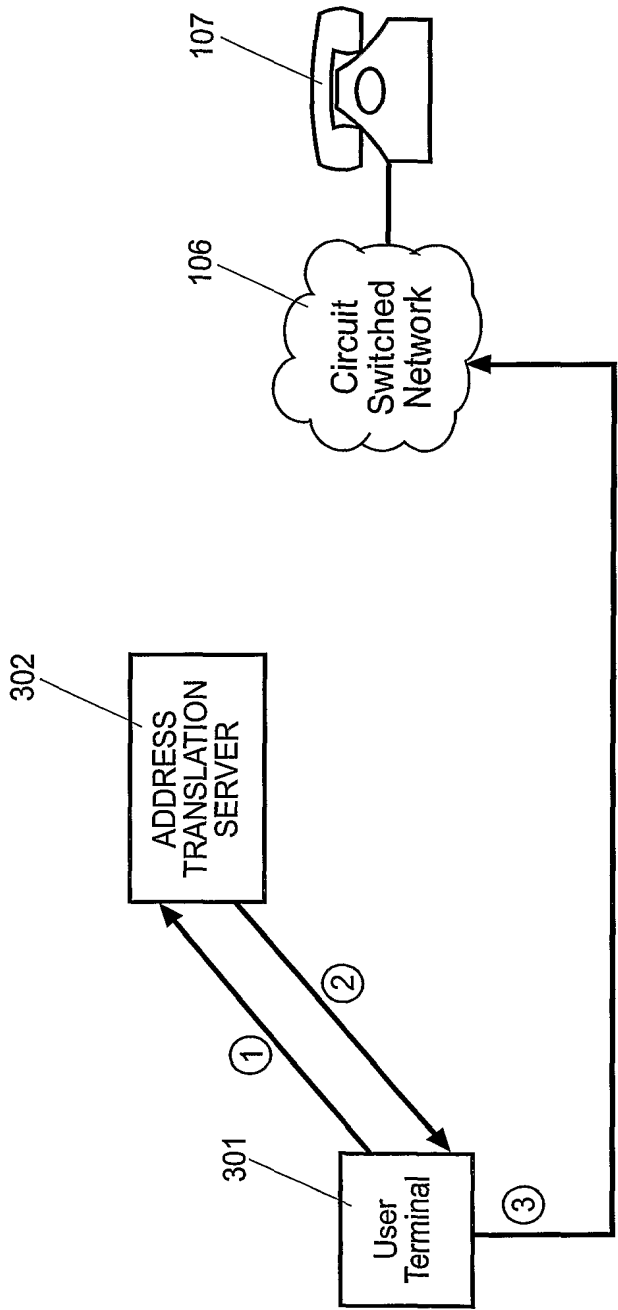


Fig. 3

4/9

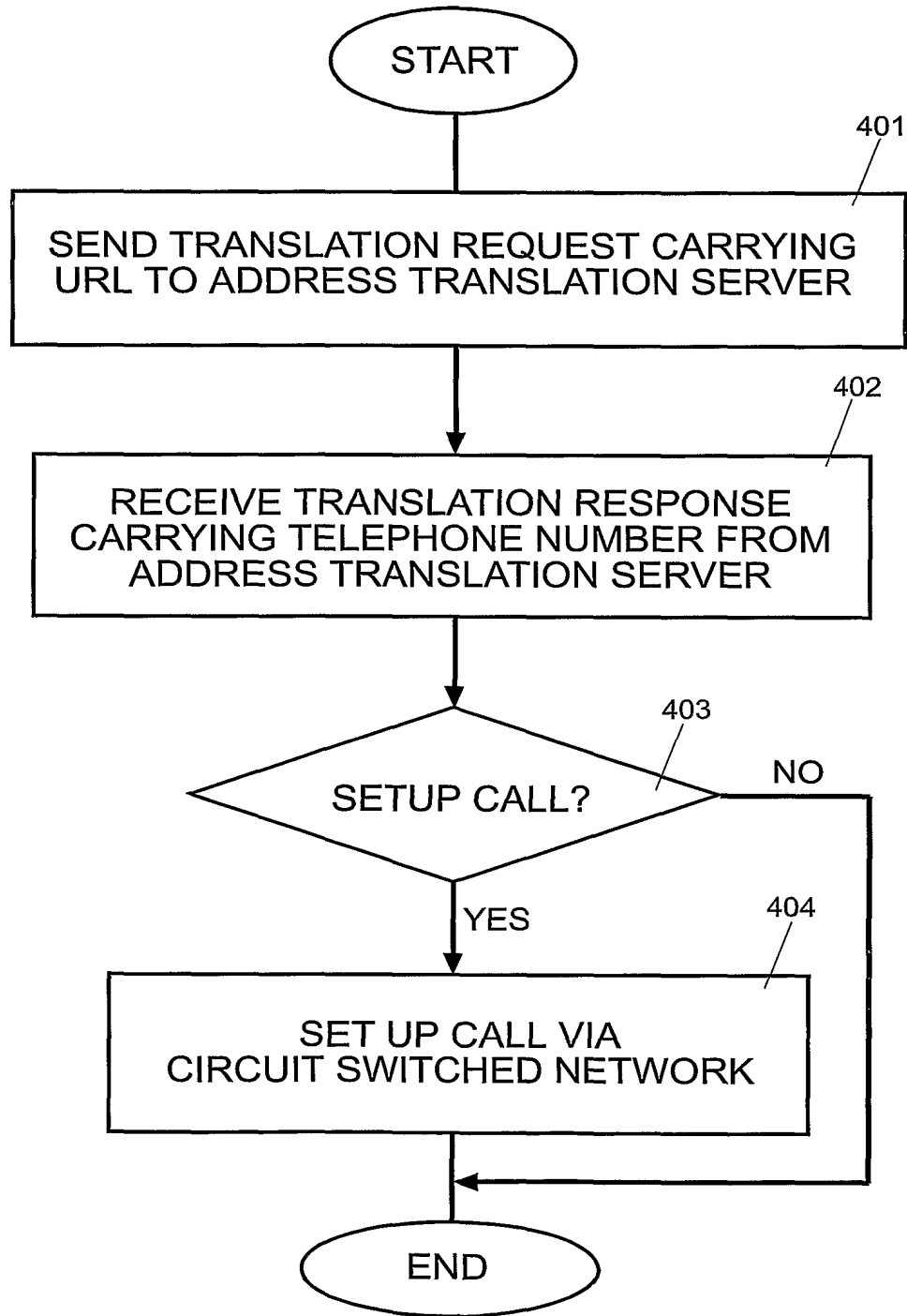


Fig. 4

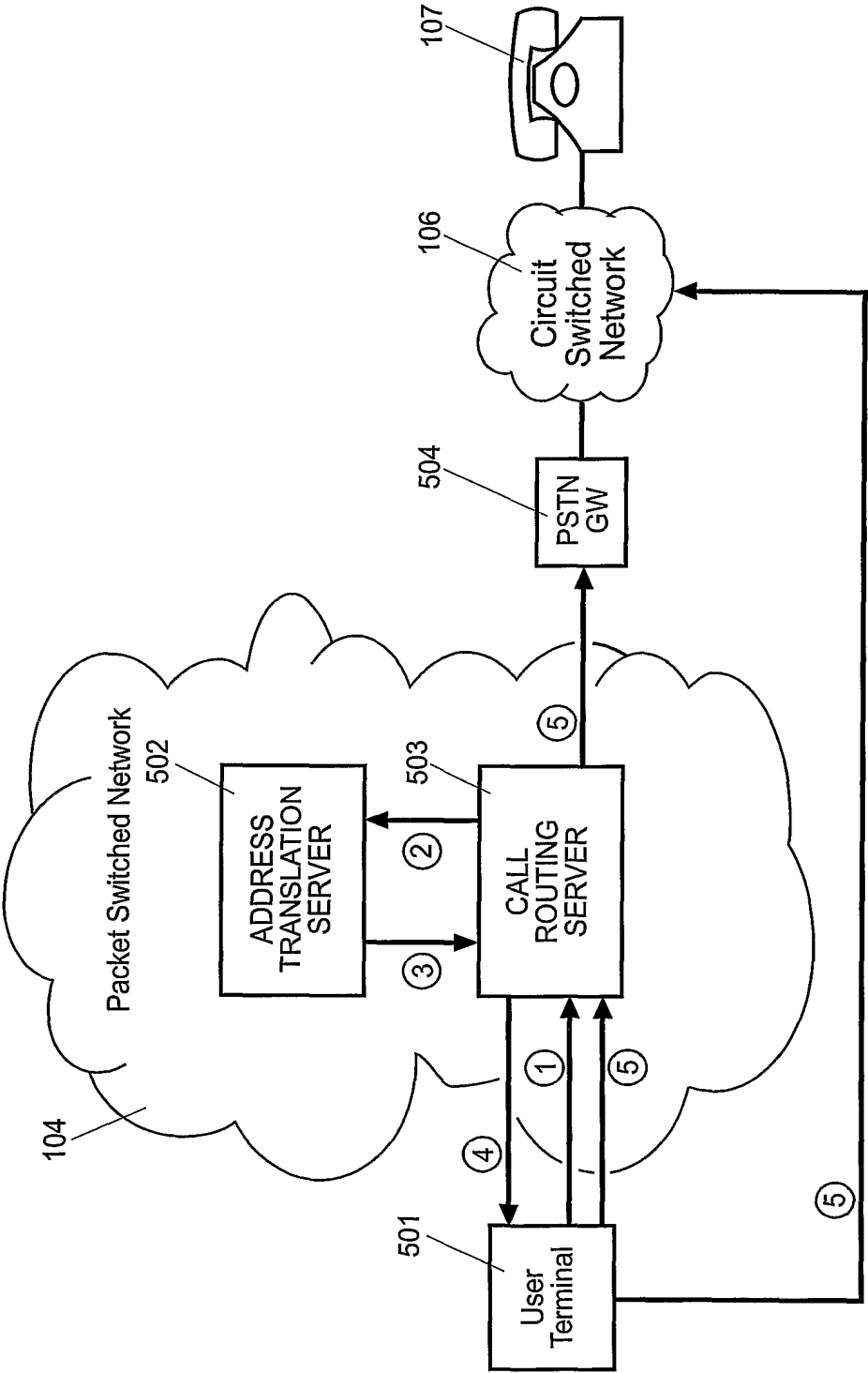


Fig. 5

6/9

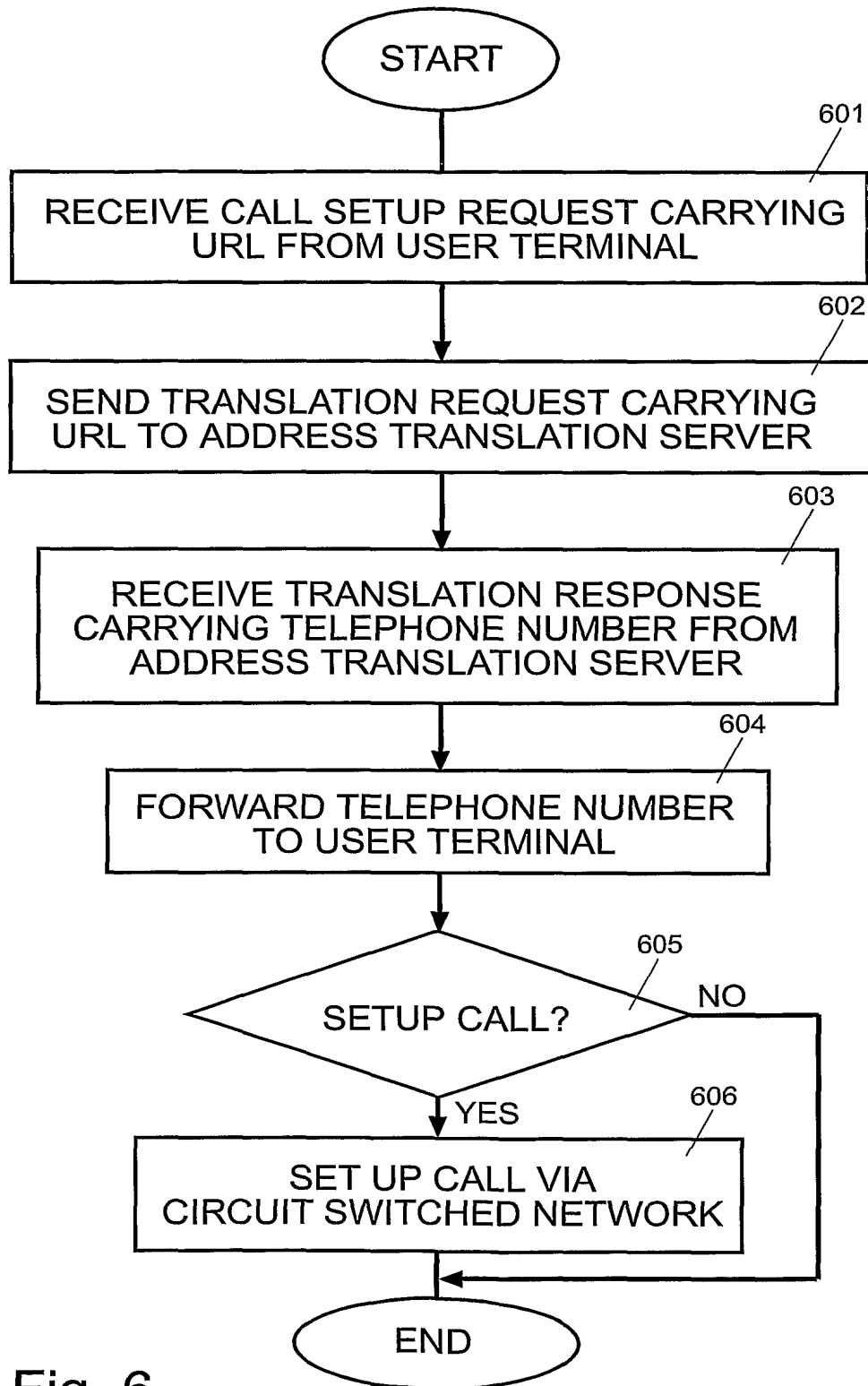


Fig. 6

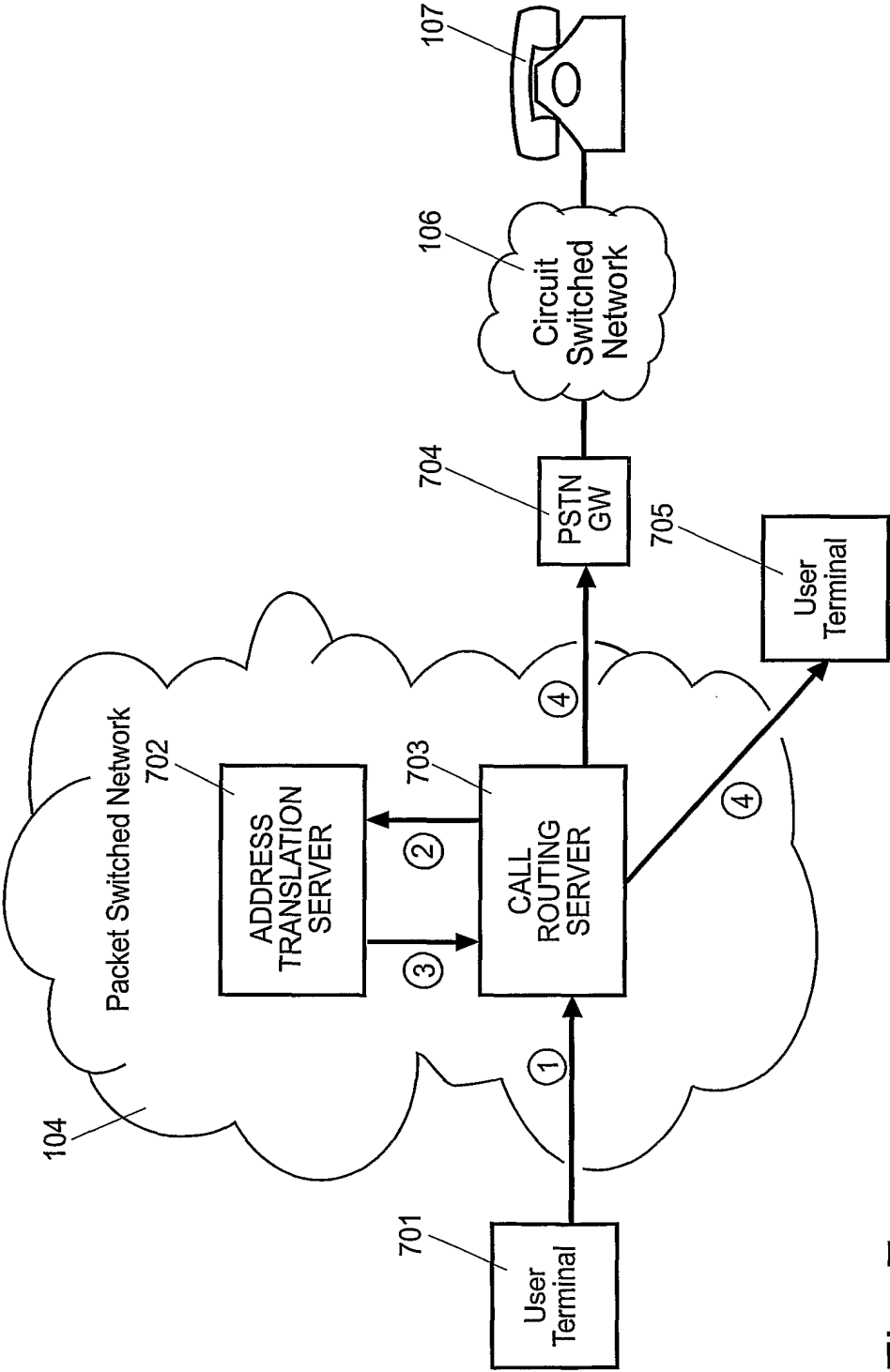


Fig. 7

8/9

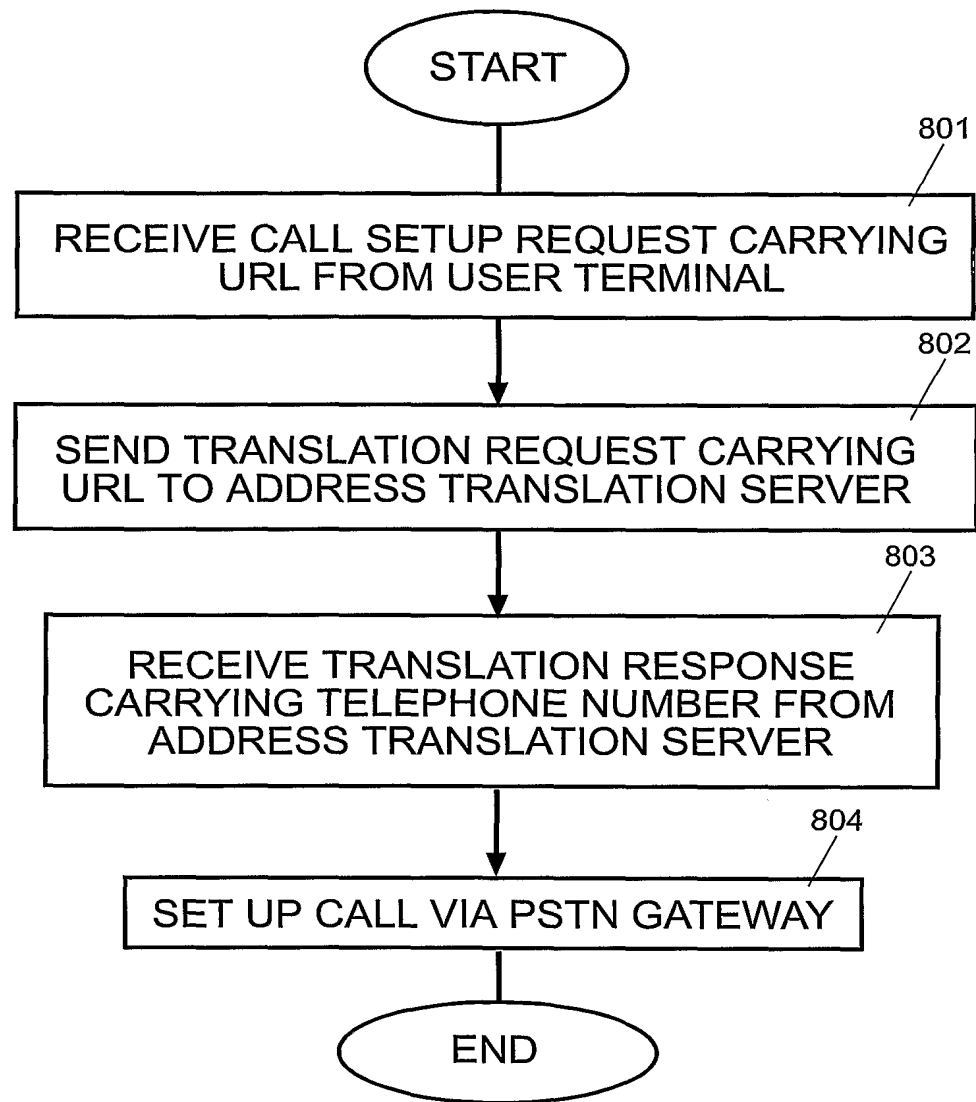


Fig. 8

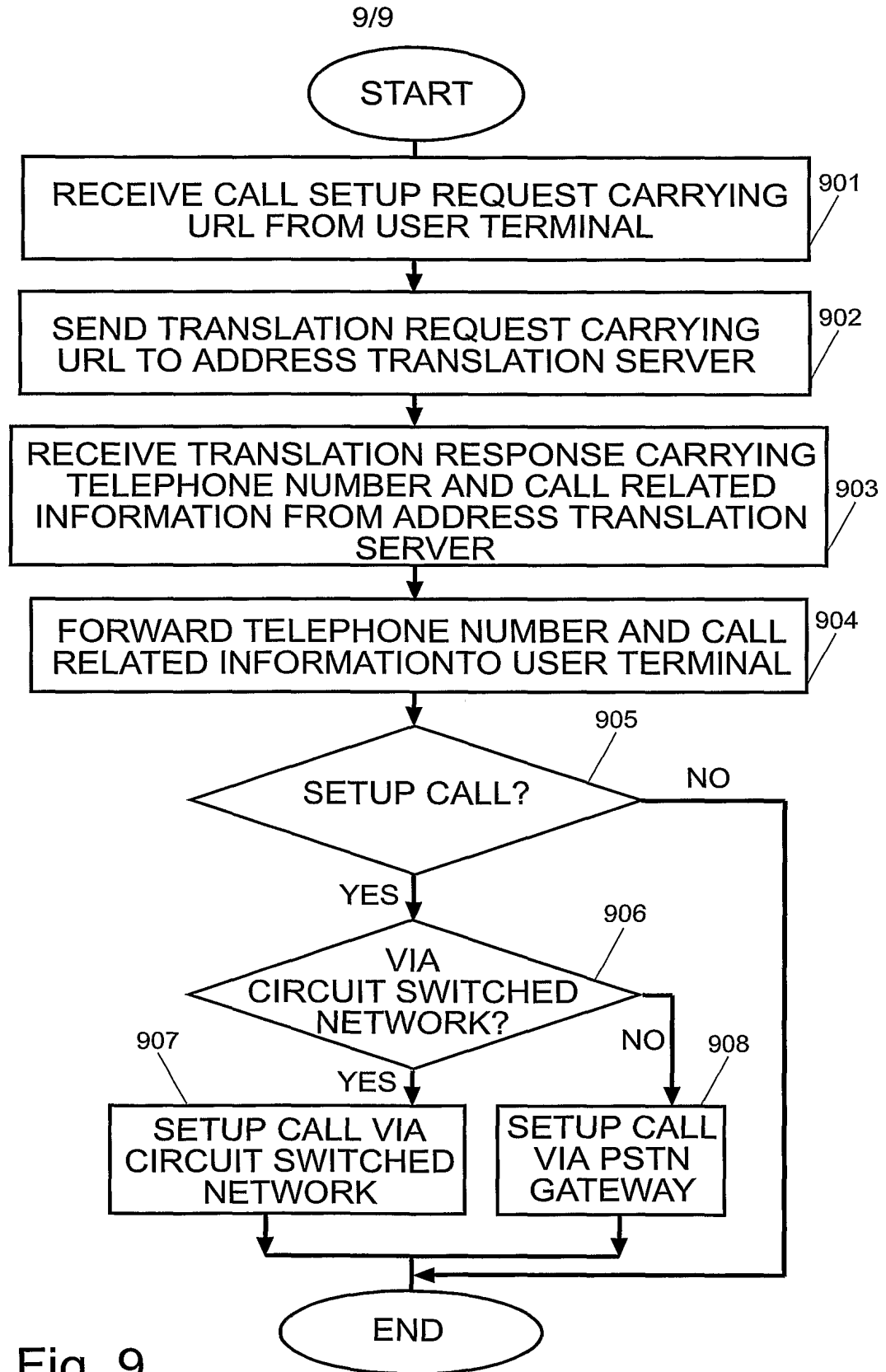


Fig. 9

INTERNATIONAL SEARCH REPORT

In International Application

PCT/FI 02/00610

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 H04M3/42 H04Q7/38 H04L29/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 H04M H04Q H04L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and; where practical, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	FR 2 781 067 A (GEMPLUS CARD INT) 14 January 2000 (2000-01-14) page 5, line 8 - line 20 page 8, line 7 - line 15 abstract	1-64
Y	--- DE 100 33 614 A (MANNESMANN AG ;SIEMENS AG (DE)) 24 January 2002 (2002-01-24) abstract; claims 1-20	1-64
A	--- WO 99 60767 A (BRITISH TELECOMMUNICATION PUBLIC LTD COMP.) 25 November 1999 (1999-11-25) page 4, line 2 -page 11, line 6; claims 1,6,7 --- -/--	1-64

☒ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

* Special categories of cited documents :

- "A" document defining the general state of the art which is not considered to be of particular relevance
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Date of the actual completion of the international search

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INTERNATIONAL SEARCH REPORT

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